CA-NV AWWA Water Loss Technical Assistance Program

Wave 4 Water Audit Level 1 Validation Document

Validator Provided

Audit Information:

Utility: Corcoran PWS ID: 1610004

System Type: Potable Audit Period: Calendar 2016

Utility Representation: Dylan Zable (water treatment plant operator)

Validation Date: 8/4/2017 Call Time: 2PM Sufficient Supporting Documents Provided: Yes

Validation Findings & Confirmation Statement:

Key Audit Metrics:

Data Validity Score: 39 Data Validity Band (Level): Band II (26-50)

ILI: 7.79 Real Loss: 3,767.84 (gal/mile-main/day) Apparent Loss: 29.49 (gal/conn/day)

Non-revenue water as percent of cost of operating system: 3.0%

Certification Statement by Validator:

This water loss audit report has been Level 1 validated per the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34.

All recommendations on volume derivation and Data Validity Grades were incorporated into the water audit. ☐ Yes

Validator Information:

Water Audit Validator: Reinhard Sturm / Carolyn Prescott (support)

Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

CA-NV AWWA Water Loss Technical Assistance Program

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Water System Name: City of Corcoran **Water System ID Number:** 1610004 **Water Audit Period:** Calendar 2016

Water Audit & Water Loss Improvement Steps:

Steps taken in preceding year to increase data validity, reduce real loss and apparent loss as informed by the annual validated water audit:

The City of Corcoran has already incorporated various new methods for data validity, most notably for volumetric sources. The City now measures each wells' flow rates by comparing tank level over time, rather than rely solely on flow meter. The City has also initiated receiving information for meterizing all flat-rate valves that still exist in the town. There is also plans for testing water meters when consumption falls too high or too low from previous months or years.

Certification Statement by Utility Executive:

This water loss audit report meets the requirements of California Code of Regulations Title 23, Division 2, Chapter 7 and the California Water Code Section 10608.34 and has been prepared in accordance with the method adopted by the American Water Works Association, as contained in their manual, *Water Audits and Loss Control Programs, Manual M36, Fourth Edition* and in the Free Water Audit Software version 5.

Executive Name (Print)	Executive Position	Signature	Date
Joseph Faulkner	Public Works Director		9/25/17
Dylan S. Zaske	Water Plant Operator		9-25-17

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Validator Qualifications: Contractor for CA-NV AWWA Water Loss TAP

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
1	Volume from Own Sources	VOS	3	Supply meter profile: Operate 9 active wells, 10 total. Each well is metered. All wells feed into a mixing tank and from there to a treatment plant. VOS input derived from: SCADA reads from well production meters as archived. Comments:Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of own supply metered: 100% Signal calibration frequency: None. Volumetric testing frequency: None. Volumetric testing method: n/a Percent of own supply tested and/or calibrated: None. Comments:No additional comments.
2	VOS Master Meter & Supply Error Adjustment	VOS MMSEA	3	Input derivation: Left blank in absence of available test data. Net storage change included in MMSEA input: No. Comments: Opportunity to use mixing tank to determine well meter accuracy. Going forward you would determine this as a weighted average across volumes at each meter and their accuracy.	Supply meter read frequency: Continuous. Supply meter read method: Automatic logging via SCADA telemetry. Frequency of data review for trends & anomalies: Monthly. Storage levels monitored in real-time: Yes. Comments:No additional comments.
3	Water Imported	WI	n/a	n/a	n/a
4	WI Master Meter & Supply Error Adjustment	WI MMSEA	n/a	n/a	n/a
5	Water Exported	WE	n/a	n/a	n/a
6	WE Master Meter & Supply Error Adjustment	WE MMSEA	n/a	n/a	n/a
7	Billed metered	BMAC	3	Customer meter profile: Age profile: 1700 metered customers with meters varying in age averaging around 10-12 years. Newer construction is metered. Largest consumer, about 50% of population, is the prison. Reading system:Manual. Read frequency:Monthly. Comments:Lag-time correction is not employed in input derivation. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Percent of customers metered: >50% Small meter testing policy: Reactive - complaint based or flagged-consumption testing only. Number of small meters tested/year:Dependent on number of customer complaints or billing flags. Large meter testing policy:Reactive - complaint based or flagged-consumption testing only. Number of large meters tested/year:Dependent on number of instances of flags. Meter replacement policy:Upon failure only. Number of replacements/year:Not quantified, but known to be small.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
					Billing data auditing:Standard billing QC, plus review of volumes by use type each billing cycle. Comments:No additional comments.
8	Billed unmetered	BUAC	3	Profile: In pursuit of funds to fully meter entire customer meter population. Currently about 50% of customers receive flat rate billing. Most unmetered accounts are residential. Input derivation:Rudimentary estimate. Based on an assumption of losses. Comments: Consider using an average customer consumption from billed accounts, with an allowance for less conservation due to lack of metering.	Policy for metering exemptions: Migration to fully metered status is being pursued. New developments are required to be metered. Grandfathered in connections remain unmetered. Comments:No additional comments.
9	Unbilled metered	UMAC	n/a	Profile: n/a Input derivation: n/a Comments:n/a	Policy for billing exemptions: n/a Comments:n/a
10	Unbilled unmetered	UUAC	5	Profile: Own use, operational flushing and fire department usage. Comments:Flushing activities greatly scaled back due to drought. Custom California default of 0.25%xWS utilized.	Comments:Default grade applied.
11	Unauthorized consumption	UC	5	Comments:Default input applied.	Comments:Default grade applied.
12	Customer metering inaccuracies	CMI	1	See BMAC comments regarding meter testing & replacement activities. Input derivation: Rudimentary estimate. Estimate that average age of customer meters is 10-12 years. Comments:Conservative estimate input into audit.	Characterization of meter testing: None. Characterization of meter replacement: Limited (upon failure only). Comments:No additional comments.
13	Systematic data handling errors	SDHE	5	Comments:Default input applied.	Comments:Default grade applied.
14	Length of mains	Lm	1	Input derivation: Rudimentary estimate. Based on water system map. Hydrant leads included: No. Comments:No additional comments.	Mapping format: Paper. Asset management database:Not currently in place. Map updates & field validation:Updates are logged, but updates have not yet been incorporated into map since 2010. Comments:No additional comments.
15	Number of service connections	Ns	3	Input derivation: Standard report run from billing system. Basis for database query: Account ID - non-premise based. Comments:Includes active and inactive accounts.	CIS updates & field validation: Accomplished through normal meter reading processes. Estimated error of total count within: 3%.

#	AWWA Water Audit Input	Code	Final DVG	Basis on Input Derivation	Basis on Data Validity Grade
					Comments:Policy in place for tracking new accounts.
16	Ave length of cust. service line	Lp	10	Comments:Default input and grade applied, as customer meters are typically located at the property boundary given California climate.	
17	Average operating pressure	AOP	3	Number of zones, general profile: Discharge pressure is set at 50 PSI. System is fairly flat. Do not operate designated pressure zones. Typical pressure range: 50 – 40 PSI Input derivation: Derived from pump set pressure. Comments:No additional comments.	Extent of static pressure data collection: Collected in response to low pressure complaints. Characterization of real-time pressure data collection: Basic - telemetry or pressure logging at boundary points (supply locations, tanks, boosters) recorded in SCADA. Hydraulic model: None currently in place. Comments:No additional comments.
18	Total annual operating cost	TAOC	7	Input derivation: From official financial reports. Comments:Confirmed costs limited to water only, and water debt service included.	Frequency of internal auditing:Annually. Frequency of third-party CPA auditing:Annually. But not specifically the water budget. Comments:No additional comments.
19	Customer retail unit cost	CRUC	8	Input derivation: Single rate class selected, with some rate classes excluded. Sewer charges are based on water meter readings. Sewer revenues are not incorporated into calculation. Comments:Consider calculating this as the total volumetric revenue divided by the total volume sold.	Characterization of calculation: Composite via simple rate structure with only a single rate. Input calculations have notbeen reviewed by an M36 water loss expert. Comments:No additional comments.
20	Variable production cost	VPC	4	Supply profile: Own sources only. Primary costs included: Treatment chemicals and supply & distribution power. Secondary costs included: None currently included. Comments: No additional comments.	Characterization of calculation: Primary costs only. Comments:No additional comments.

Key Audit Metrics

(~) VALIDITY Data Validity Score: 39 Data Validity Band (Level): Band II (26-50)

(#) VOLUME ILI: 7.79 Real Loss: 3,767.84 gal/mile/day Apparent Loss: 29.49(gal/conn/day)

($) VALUE Annual Cost of Apparent Losses: $77,700 Annual Cost of Real Losses: $97,599

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: Mains range from 1925 – present, with an average age falling around 60 years.

Infrastructure replacement policy (current, historic):Significant amount budgeted(2017-2018) to replace mains depending on age.

Estimated main failures/year:3-4 Estimated service failures/year:3-4

Extent of proactive leakage management: Most leaks surface quickly due to area geology.

Other water loss management comments:No additional comments.

Comments on Audit Metrics & Validity Improvements

The Infrastructure Leakage Index (ILI)of 7.79describes a system that experiences leakage at 7.79 times the modeled technical minimum for its system characteristics.

The Data Validity Score falling within Band II (26-50) indicates that next steps should be generally focused on improving data reliability. Opportunities to improve the reliability of audit inputs and outputs include:

- Calculating a volume of billed unmetered consumption based on site specific estimation methods, or metered volumes consumed by similar customers.
- Improved understanding of Supply Meter (Own or Import) Master Meter Error: consider adopting or increasing the rigor of a source meter volumetric testing and calibration program, informed by the guidance provided in AWWA Manual M36 – Appendix A.
- Improved estimation of CMI: consider a customer meter testing program which tests a sample of random meters whose stratification (by size, age, or other characteristics) represents the entire customer meter stock.

When the CA-NV AWWA Water Audit Validator (WAV) program comes online after this year, is the utility planning on having a staff member become certified to perform the Level 1 Validation for future audits? Yes.